



# Habitat Expansion Agreement

for

## Central Valley Spring-Run Chinook Salmon and California Central Valley Steelhead

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### Questionnaire Instructions

The attached questionnaire is intended to solicit information needed by the Steering Committee to review projects relative to the criteria established in the Habitat Expansion Agreement. For each proposed action (project), please complete the questionnaire to the fullest extent possible. Please provide citations where applicable and provide a full reference for each citation at the end of this questionnaire (Section X. Supporting Documents). Specific instructions follow.

#### I. Contact Information

Provide the name of the agency or group making the proposal as well as a contact person for the project. Include contact information such as mailing address, phone number, and email address.

#### II. Project Description

Provide a descriptive name for the action (project). If the action is listed in the *Working List of Potential Habitat Expansion Actions* (provided during the January 2009 meetings of HEA parties), please include the reference number associated with the action. The project location should specify the watershed or subwatershed (e.g., Deer Creek, Beegum Creek) as well as specific areas within the watershed where the project will be located and what portions of the watershed will benefit from the project. Please include geographic coordinates of the project location(s), if applicable. The project description should be a narrative that provides as much detail as possible about the project.

#### III. Species Limiting Factors

In this section, indicate the factors that currently limit production of spring-run Chinook salmon and/or steelhead in your watershed. The intent is that the environmental and biological objectives of your project address these limiting factors in some way. Please check one or more of the limiting factors that apply to your watershed. In the second column, describe how and where the factor limits spring-run Chinook salmon and/or steelhead. For each factor that you check, please rank its effect on spring-run Chinook salmon and/or steelhead using the drop-down box in the last column. Finally, we also ask that you describe the source of your conclusions, such as a watershed assessment or other document. Please provide enough information that we can find the document if we need it.

#### IV. Project Objectives—Environmental

Environmental objectives describe how the project is intended to address the limiting factors to achieve the biological objective described in the next section. Environmental objectives should be as specific and quantitative as possible (e.g., reduce gravel embeddedness in the watershed from 75% to 25% by fencing riparian areas to exclude cattle and allow riparian forest to reestablish). Describe how you think environmental objectives relate specifically to the biological objectives. In the last column, we ask you to describe the environmental objectives as either the primary or secondary focus of the project. For example, a project to plant trees might have a primary focus on riparian/floodplain function with a secondary focus on temperature or water quality.

## **V. Project Objectives—Biological**

Biological objectives describe the anticipated biological response from the project and should be as quantitative as possible. Indicate which species and life stages are the focus of the project. Describe specifically the general condition of the target species in your watershed relative to the historical abundance. The condition of the species should be indicated using the categories in the drop-down box. Species condition categories are defined on the last page of this form. Biological objectives should include the following information: (1) an estimate of the expected contribution of the project in terms of potential adult returns, to the extent possible (and an explanation of how the estimate was developed); and (2) an explanation of how the biological objective for the species is addressed by the action relative to the environmental limiting factors (e.g., the biological objective of an action might be to increase egg incubation survival in a watershed that is currently limited by sediment levels).

## **VI. Project Cost**

To the extent possible, estimate the capital cost of the project, the annual operating and maintenance (O&M) cost, a description of annual O&M activities, and the project lifetime (i.e., how many years O&M activities are expected, including indefinitely, and how long until you expect the project to provide benefits). Provide any confirmed or potential funding partners, or opportunities for cost sharing with other funders or between projects. Also, identify any confirmed or potential partners that might provide maintenance support for the project (funding support or labor support).

## **VII. Schedule**

Describe the project schedule, including a potential start date, construction period, and environmental and biological response times (i.e., the expected time to realize environmental and biological benefits). The last points refer to the maturation period for the project during which time environmental conditions develop. For example, it may take 50–100 years before full environmental benefits (e.g., shading, channel stability, water quality) of planting riparian trees are realized.

## **VIII. Feasibility**

Describe the feasibility and challenges of the project. Feasibility issues should include primarily technical issues, success of projects utilizing similar technology, and particular challenges posed by the specific project. Other issues of feasibility that may be included are challenges associated with property ownership, permitting, zoning, and other social-economic-legal issues.

## **IX. Project Support**

Describe the support or potential conflicts associated with the project. Specifically, provide supporting and cooperating entities (e.g., agencies, non-governmental organizations). Are there cooperating agencies or groups, aside from the potential funding partners mentioned previously? Describe the degree of local support and any known opposition or conflicts with other parties.

## **X. Supporting Documents**

Provide full references for each citation used to support the information presented in this questionnaire for your project. At a minimum, a reference should include the author(s) name; name of agency/organization (if applicable); title of the document; volume and title of journal, if the document is taken from a professional journal; and publisher, date, and location of publication.



# Questionnaire

for

## Information on Potential Projects to Support Spring-Run Chinook Salmon and Steelhead in the Sacramento River Basin for the Habitat Expansion Agreement

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**DUE: Friday, February 27, 2009**

**Send completed questionnaires to [hea@water.ca.gov](mailto:hea@water.ca.gov)**

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### I. Contact Information

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**Name:** Brenda Olson  
**Organization:** U.S. Fish & Wildlife Service  
**Address:** 10950 Tyler Road  
**City, State, Zip Code:** Red Bluff, CA 96080  
**Phone Number:** 530-527-3043 x227  
**Email Address:** Brenda\_Olson@fws.gov

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### II. Project Description

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**Project Name:** Real-time flow and temperature monitoring gages on Big Chico, Butte, Deer, and Mill Creeks (with possible expansion to Antelope Creek)  
**Reference No. or New:** New (but related to NS-1, NS-27, NS-33/37, NS-36, NS-51, NS-55, NS-58)  
**Project Location:** Big Chico, Butte, Deer, and Mill Creeks present gage stations

**Project Description:**

Project Description:  
This project funds the continued operation and maintenance of 13 real-time flow and temperature monitoring stations that are part of an effort to assess, acquire, and manage minimum base instream flows in four eastside Sacramento River Tributaries. Funding for the present gage operations disappears in 2010. Based on a brief phone conversation with Curtis Anderson on 2/24/09, we understand that John Clements, DWR Red Bluff (530-529-7323) is the person to work with to get a more complete description of the current status and historic operations of these gages.

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## II. Project Description

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### Objective:

The Real-Time Flow and Temperature Monitoring project includes (1) Long-term reach specific flow and temperature measurements for each tributary to provide a basis for future flow acquisitions and flow management for anadromous fish; and (2) Long-term reach specific flow and temperature measurements for each tributary will significantly contribute to the recovery and future survival of spring-run salmon and steelhead populations in Big Chico, Butte, Deer, and Mill Creeks (potential expansion of flow monitoring in Antelope Creek is also an objective).

### Background:

Due to AFRP start up (FY 96 and 97) and CALFED funding, these gages have been instrumental in the following:

- Butte Creek flow measurements are incorporated into conditions of a Bureau of Reclamation water right exchange agreement, and a permanent filing with the State Water Resources Control Board for instream water dedication.
- Butte Creek flow information is being incorporated into management agreements on fish screens and ladders.
- Mill and Deer Creeks' flow records are being used to provide real-time flow management input to the Mill Creek Water Exchange agreement and the interim Deer Creek Water Exchange Agreement.
- Mill, Deer, Big Chico, and Butte Creeks flow data was used by the Delta Operations Sacramento River Spring-run Protection Plan for the period of 1997 – 2004, and were instrumental in the operation and management of the Delta Cross Channel gates.

These gages provide critical information to agencies, landowners, and irrigation districts in making managerial decisions about anadromous fish survival, including those decisions that need to be made in real time.

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## III. Species Limiting Factors

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In this section, describe the limiting factors for spring-run Chinook salmon and steelhead in your watershed. The last page of this questionnaire defines the limiting factors.

<u>Limiting Factors</u>	<u>Description (from back page)</u>	<u>Rank</u>
<input type="checkbox"/> Channel Form		Select Rank
<input type="checkbox"/> Channel Unit Types		Select Rank
<input type="checkbox"/> Substrate		Select Rank
<input type="checkbox"/> Structure		Select Rank
<input checked="" type="checkbox"/> Flow	Early irrigation during low water years interferes/delays upstream migration of adults, and affects juvenile outmigration and stranding. Knowing the real-time streamflows and water temperature is instrumental in working with the irrigation districts to negotiate water exchange agreements. This information is crucial to the management of the Mill Creek water exchange agreement in place with Los Molinos Mutual Water Company.	Critical

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### III. Species Limiting Factors

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<input checked="" type="checkbox"/> <b>Temperature</b>	Related to flow in valley floor reach of streams.	High
<input type="checkbox"/> <b>Water Quality</b>		Select Rank
<input checked="" type="checkbox"/> <b>Passage</b>	Decreased flows, especially during low water years, due to early irrigation. Three irrigation dams in Deer Creek, one in Antelope Creek, two in Mill Creek, many in Butte Creek.	Critical
<input type="checkbox"/> <b>Riparian/Floodplain</b>		Select Rank

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#### Source Documents:

see below

#### Additional Notes:

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### IV. Project Objectives—Environmental

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In this section, describe how your project will affect one or more of the limiting factors for spring-run Chinook salmon or steelhead described above.

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<u>Limiting Factor</u>	<u>Description and Objective</u>	<u>Focus</u>
<input type="checkbox"/> <b>Channel Form</b>		Select Focus
<input type="checkbox"/> <b>Channel Unit Types</b>		Select Focus
<input type="checkbox"/> <b>Substrate</b>		Select Focus
<input type="checkbox"/> <b>Structure</b>		Select Focus
<input checked="" type="checkbox"/> <b>Flow</b>	The gages will help water managers implement water exchange agreements, as well as negotiate water exchange agreements, for fish passage flows in 4 east-side Sacramento River tributaries.	Primary
<input checked="" type="checkbox"/> <b>Temperature</b>	Temperature and flow real-time monitoring will assist in determining appropriate times for release of pulse flows in moving adult spring-run up into the systems or moving juveniles out of the systems.	Primary
<input type="checkbox"/> <b>Water Quality</b>		Select Focus
<input checked="" type="checkbox"/> <b>Passage</b>	same as flow and temp	Primary
<input type="checkbox"/> <b>Riparian/Floodplain</b>		Select Focus

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## V. Project Objectives—Biological

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In this section, describe the objective(s) of your project relative to the goal of providing habitat for spring-run Chinook salmon and steelhead. Indicate the species and life stage that are targeted by the project. (It is okay to have more than one species/life stage target).

**Target Species:** ☒ Spring-Run Chinook Salmon **Population Status Specific to Watershed:** Decreasing

**Target Life Stages:**

☐ Spawning ☐ Egg Incubation ☐ Summer Rearing ☐ Winter Rearing  
☒ Juvenile Emigration ☒ Adult Immigration ☐ Adult Holding

**Description of Project Objectives:**

Gave a Decreasing status due to 3 out of 4 watersheds are decreasing.

Project objective is to manage water/flow for successful spring chinook adult immigration and juvenile emigration thereby increasing survival within the four watersheds.

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**Target Species:** ☐ Steelhead **Population Status Specific to Watershed:** Relative to Historical

**Target Life Stages:**

☐ Spawning ☐ Egg Incubation ☐ Summer Rearing ☐ Winter Rearing  
☐ Juvenile Emigration ☐ Adult Immigration

**Description of Project Objectives:**

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## VI. Project Cost

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<b>Capital Cost:</b>	Approximately \$9,000 - 10,000 per gage; setup costs if allowed to be removed before funding is awarded (guess). Equipment is already purchased, would have to set the site up again. \$40,000 setup cost to install a gage on Antelope Creek.
<b>Annual Operation and Maintenance Cost:</b>	\$120,000/yr; If Antelope Creek added, approximately \$130,000/yr.
<b>Annual Operation and Maintenance Description:</b>	?
<b>Project Lifespan:</b>	Could be indefinite
<b>Project Partners (Funding):</b>	AFRP funded in 96-97, CALFED funded 2001 - 2009, not aware of who funded '98 - 2000.
<b>Project Partners (Maintenance):</b>	Potentially DWR, they currently run the lower gages in Mill and Deer; USGS is responsible for the gages at the canyon mouths on these two streams.

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## VII. Schedule

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<b>Proposed Start:</b>	ASAP
<b>Expected Time to Completion:</b>	indefinite
<b>Expected Time to Realize Environmental Benefits:</b>	first spring season after funding
<b>Expected Time to Realize Biological Benefits:</b>	first spring season after funding

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## VIII. Feasibility

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<b>Technical Feasibility:</b>	Is currently operating.
<b>Technical Challenges:</b>	Finding suitable site on Antelope Creek
<b>Related Projects:</b>	Numerous watershed restoration projects have been completed, are in progress, or are planned in the four watersheds.
<b>Ownership or Permitting Challenges:</b>	Landowner permission on Antelope Creek.
<b>Conflicts with Cultural, Zoning, or Other Issues:</b>	unknown

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## IX. Project Support

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<b>Supporting Entities:</b>	CDFG, USFWS, DWR
<b>Cooperating Entities:</b>	Los Molinos Mutual Water Company, TNC, Ducks Unlimited
<b>Degree of Local Support:</b>	High
<b>Known Opposition:</b>	unknown

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## X. Supporting Documents

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**Please provide a full reference for each citation used to support the information presented in this questionnaire.**

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DWR Fish Passage Report, 1995

USFS. 2000. Mill, Deer, Antelope Creeks Watershed Analysis. Lassen National Forest.

USFWS. 2008. Internal document of Limiting Factors developed for 10 year CVPIA Implementation Strategy.

USFWS. 2001. Final Restoration Plan for the Anadromous Fish Restoration Program.

CH2MHill. 1997. Mill Creek Watershed Management Strategy Report, Lassen Watershed Project. Prepared for

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## **X. Supporting Documents**

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the Mill Creek Conservancy.

Deer Creek Watershed Conservancy. 1998. Deer Creek Watershed Management Plan. Prepared for the CA State Resources Agency, State Water Resources Control Board, and the USFWS.

Butte Creek Watershed Conservancy. Existing Conditions Report. ([buttecreekwatershed.org/ecr/new/chapt6.htm](http://buttecreekwatershed.org/ecr/new/chapt6.htm))

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## **Definitions of Limiting Factors for Spring-Run Chinook Salmon and Steelhead**

### **Channel Form**

This attribute describes changes to the channel, including incision, aggradation, diking, armoring, and other modifications of the channel adversely affecting spring-run Chinook salmon and steelhead.

### **Channel Unit Types**

Examples of geomorphic features of the channel that form habitat types for spring-run Chinook salmon and steelhead are pools, riffles, glides, and runs. This attribute describes changes in the frequency and size of such features. For example, removal of large wood may reduce the frequency of pools, presence of steps, or retention of gravel for riffles.

### **Substrate**

This attribute describes changes in the composition of the substrate of the stream, including increase in fine sediment and lack of gravel recruitment.

### **Structure**

This attribute describes the loss of structural elements in the stream such as large wood, boulders, undercut banks, and so on. Loss of structure results in a simplification of the channel and influences Channel Form and Channel Unit Types.

### **Flow**

This attribute addresses modification of the flow regime, including decrease in summer low flow, increased “flashiness,” and dewatering of the channel as a result of withdrawals.

### **Temperature**

Change in water temperature can be attributable to human actions such as removal of riparian shading. This attribute describes the increase in summer water temperature and the loss of temperature refugia (springs or groundwater) as a result of human actions.

### **Water Quality**

This attribute pertains to the input to the stream of toxins or pollutants that produce adverse impacts on spring-run Chinook salmon or steelhead. This can include chemical pollutants such as fertilizer and pesticides and nutrient sources such as cattle and feedlots.

### **Passage**

This relates to the effect of impediments to adult or juvenile migration of spring-run Chinook salmon or steelhead, including dams, culverts, channel dewatering, and other structural and channel modifications. Please describe the location of the passage impediment and describe the extent of impediment (i.e., a complete or partial blockage to migration).

### **Riparian/Floodplain**

This attribute describes the loss of functionality of the riparian forest/vegetation and the connection of the stream to the floodplain during high water and flooding.

## **Population Condition Definitions for Section V. Project Objectives—Biological**

### **Increasing**

Adult returns of the target species to the watershed have generally been increasing over the last several years; expectations are that the species is displaying characteristics of a rebuilding or healthy population.

### **Stable**

Adult returns of the target species to the watershed show no clear trend over the last several years.

### **Decreasing**

Adult returns of the target species to the watershed are declining over the last several years; the decline in abundance is a cause of concern and characteristic of a potentially unhealthy population.

### **Intermittent**

Adult returns of the target species are occasionally seen in the watershed, but there is no viable or sustained population in the basin.

### **Extirpated**

The population has been eliminated from the watershed although the species was present in the past.

### **Never Present**

The species has never been known to occur in the watershed.